AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method of identifying a candidate phosphatase and tensin homolog (PTEN) pathway modulating agent, said method comprising the steps of:

(a) providing a first assay system comprising a microtubule affinity regulating kinase (MARK) nucleic acid ~~selected from the group consisting of~~ comprising SEQ ID NO: 5 [[s: 1-13]] or a functionally active fragment or derivative thereof, wherein the functionally active fragment or derivative has kinase activity;

(b) contacting the first assay system with a test agent under conditions whereby, but for the presence of the test agent, the system provides a reference activity;

(c) detecting a test agent-biased activity of the first assay system, wherein a difference between the test agent-biased activity and the reference activity identifies the test agent as a candidate PTEN pathway modulating agent;

(d) confirming that the test agent of (b) is a candidate PTEN pathway modulating agent by providing a second assay system comprising cultured cells or a non-human animal expressing MARK, wherein the second assay system measures a change in the PTEN pathway;

(e) contacting the second assay system with the test agent of (b); and

(f) determining a change in the PTEN pathway in the second assay system, wherein a change in the PTEN pathway between the presence and absence of said test agent confirms the test agent as a candidate PTEN pathway modulating agent.

2. (Withdrawn) The method of claim 1 wherein the assay system comprises cultured cells that express the MARK polypeptide.

3. (Withdrawn) The method of claim 2 wherein the cultured cells additionally have defective PTEN function.

4. (Withdrawn) The method of claim 1 wherein the assay system includes a screening assay comprising a MARK polypeptide, and the candidate test agent is a small molecule modulator.

5. (Withdrawn) The method of claim 4 wherein the assay is a kinase assay.

6. (Withdrawn) The method of claim 1 wherein the assay system is selected from the group consisting of an apoptosis assay system, a cell proliferation assay system, an angiogenesis assay system, and a hypoxic induction assay system.

7. (Withdrawn) The method of claim 1 wherein the assay system includes a binding assay comprising a MARK polypeptide and the candidate test agent is an antibody.

8. (Previously presented) The method of claim 1, wherein the assay system includes an expression assay comprising a MARK nucleic acid and the candidate test agent is a nucleic acid modulator.

9. (Previously presented) The method of claim 8, wherein the nucleic acid modulator is an antisense oligomer.

10. (Previously presented) The method of claim 8, wherein the nucleic acid modulator is a phosphothioate morpholino oligomer (PMO).

11. (Previously presented) The method of claim 1 additionally comprising:
(g) administering the candidate PTEN pathway modulating agent identified in (c) to a model system comprising cells defective in PTEN function and detecting a phenotypic change in the model system that indicates that the PTEN function is restored.

12. (Previously presented) The method of claim 11, wherein the model system is a mouse model with defective PTEN function.

13. (Withdrawn) A method for modulating a PTEN pathway of a cell comprising contacting a cell defective in PTEN function with a candidate modulator that specifically binds to a MARK polypeptide, whereby PTEN function is restored.

14. (Withdrawn) The method of claim 13 wherein the candidate modulator is administered to a vertebrate animal predetermined to have a disease or disorder resulting from a defect in PTEN function.

15. (Withdrawn) The method of claim 13 wherein the candidate modulator is selected from the group consisting of an antibody and a small molecule.

16. (Canceled)

17. (Previously presented) The method of claim 1, wherein the second assay system comprises cultured cells.

18. (Previously presented) The method of claim 1, wherein the assay system comprises a non-human animal.

19. (Previously presented) The method of claim 18, wherein the non-human animal mis-expresses a PTEN pathway gene.

20. (Withdrawn) A method of modulating PTEN pathway in a mammalian cell comprising contacting the cell with an agent that specifically binds a MARK polypeptide or nucleic acid.

21. (Withdrawn) The method of claim 20 wherein the agent is administered to a mammalian animal predetermined to have a pathology associated with the PTEN pathway

22. (Withdrawn) The method of claim 20 wherein the agent is a small molecule modulator, a nucleic acid modulator, or an antibody.

23. (Withdrawn) A method for diagnosing a disease in a patient comprising:

(a) obtaining a biological sample from the patient;

(a) contacting the sample with a probe for MARK expression;

(b) comparing results from step (b) with a control;

(c) determining whether step (c) indicates a likelihood of disease.

24. (Withdrawn) The method of claim 23 wherein said disease is cancer.

25. (Withdrawn) The method according to claim 24, wherein said cancer is a cancer as shown in Table I as having >25% expression level.

26. (Currently amended) The method of claim 1, wherein the first assay system comprises cultured cells that express a MARK polypeptide encoded by a polynucleotide ~~selected from the group consisting of~~ comprising SEQ ID NO: 5 [[s: 1-13]] or a functionally active fragment or derivative thereof, wherein the functionally active fragment or derivative has kinase activity.

27. (Previously presented) The method of claim 26, wherein the cultured cells additionally have defective PTEN function.

28. (Previously presented) The method of claim 17, wherein the second assay system

is selected from the group consisting of an apoptosis assay system, a cell proliferation assay system, an angiogenesis assay system, and a hypoxic induction assay system.